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Critical evaluation of faunistic data: Three species of monotrysian moths (Eriocraniidae, Prodoxidae and Incurvariidae) erroneously reported from Russia

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Abstract. The published records of *Eriocrania chrysolepidella* Zeller, 1851, *Incurvaria koerneriella* (Zeller, 1839) and *Lampronia aeneella* (Heinemann, 1870) from Chuvash and Karelia Republics in Russia are based on misidentified specimens. This finding, along with earlier reports on the widespread occurrence of errors, even in the most authoritative works, calls for a critical approach to published data in order to stop spreading and citing false information across future publications.

Introduction

All scientists know that the written word persists. We entomologists routinely use faunistic and natural history data that were published by our colleagues decades and centuries ago. The record of a species in a certain region, or on a certain host plant, causes a cascading effect on subsequent publications, in particular through the checklists and identification keys that summarize these data. Checking old faunistic and host plant records, and especially non-referenced ones, is often impossible, so we have no other option than to trust the authors of earlier publications. However, if the circumstances permit, the 'suspicious' records should indeed be scrutinized.

While updating the distribution records of several moth families for the forthcoming second edition of the Catalogue of the Lepidoptera of Russia (henceforth, the Catalogue; first edition: Sinev 2008), I recognized that Lastukhin (2001, 2007) reported three species of monotrysian moths – *Eriocrania chrysolepidella* Zeller, 1851 (Eriocraniidae), *Incurvaria koerneriella* (Zeller, 1839) (Incurvariidae) and *Lampronia aeneella* (Heinemann, 1870) (Prodoxidae) – from Chuvash Republic, located in the centre of European Russia. Lastukhin (2001) stressed that this was the first report of *I. koerneriella* and *L. aeneella* from Russia. However, no materials that I have studied to date have contained any specimens of these three species that were collected in Russia, and no other publication indicates their occurrence in Russia. Here, I report the results of re-identification of the moth specimens on which the records of these three monotrysian species from Russia were based.

Material

Albert A. Lastukhin (Cheboksary, Russia) kindly sent me the remnants of the moths that he had identified as *E. chrysolepidella* and *I. koerneriella* and had deposited in his private collection. The material consists of wings and genitalia preparations glued with transparent tape to a piece of paper (Figs 1–2); the heads, bodies and legs of the moths are absent. This extremely unusual mode of preservation of moth specimens naturally limits the possibility of their identification.

The pinned specimen, which A. A. Lastukhin reported as *L. aeneella*, was found in the private collection of Vissarion P. Losmanov (Cheboksary, Russia), based on the label information published by Lastukhin (2001). I investigated photographs of this specimen, which were kindly prepared by Leonid Egorov.

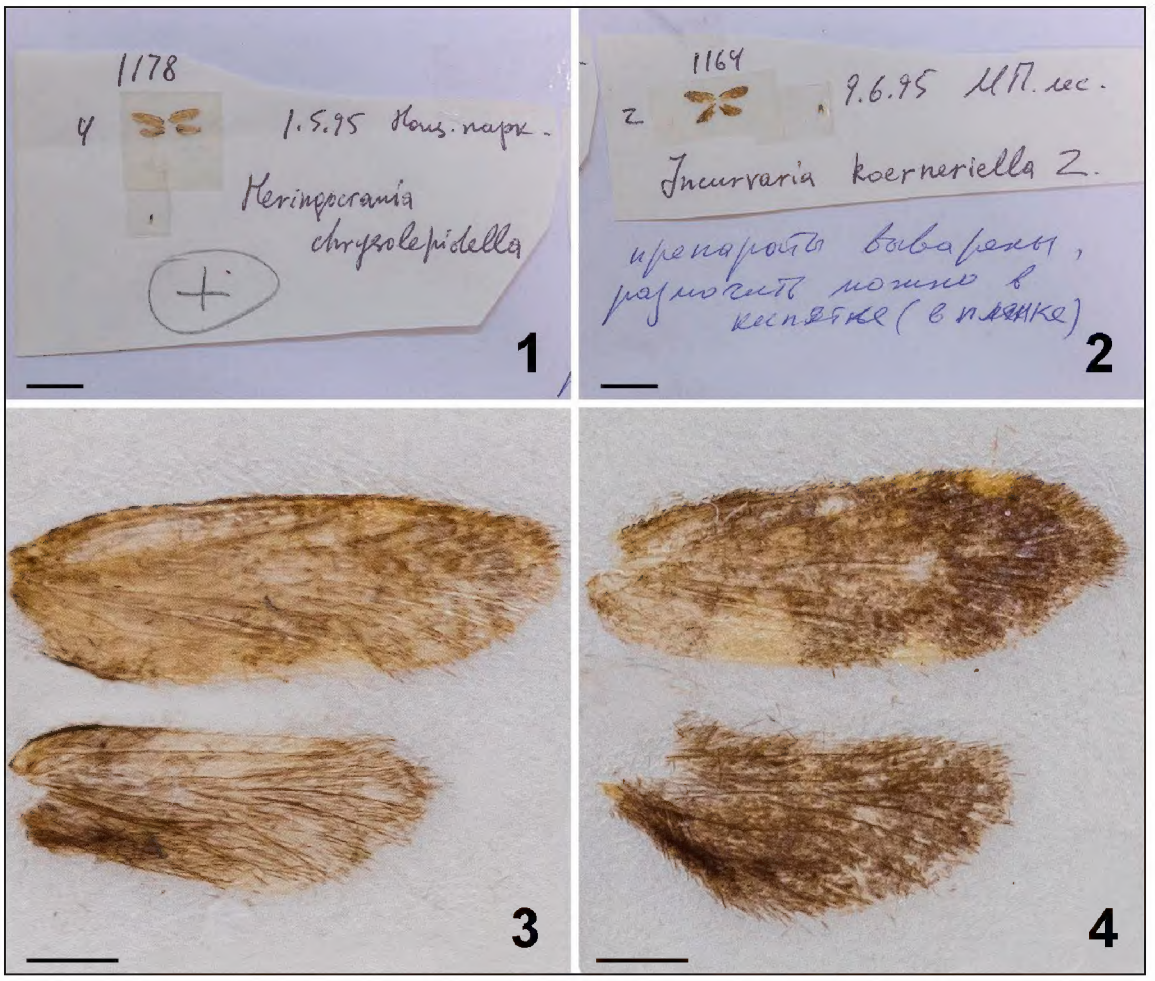
Results

The female moth identified by A. A. Lastukhin as *E. chrysolepidella* clearly belongs to a heteroneuran family, as can be concluded from its wing shape and from the presence of the single R vein in the hind wings (Fig. 3). The structure of the female genitalia (Fig. 5) narrows the possible identity of this specimen to one of the families of Adeloidea. A species-level identification is not possible, but I tentatively assign this specimen to the genus *Lampronia* Stephens, 1829. The collection date, wing size and poorly visible wing pattern jointly suggest that this specimen could belong to *L. corticella* (Linnaeus, 1758), which had been reported from the mid-Volga region (Kozlov 2008a).

In the first edition of the Catalogue, *E. chrysolepidella* was reported from Karelia Republic in Russia (Kozlov and Sinev 2008). Kutenkova et al. (2015) indicated that this record is based on an unknown data source. I revised this record and found that I had included it in the Catalogue based on one specimen labelled "Petrosaw.[odsk]" from the collection of the Zoological Institute in St. Petersburg (ZISP). The identification of this specimen (presumably made by A. K. Zaguljaev) had not been checked by me at that time, but in the course of the subsequent revision of the ZISP collection, the specimen was re-identified as *E. semipurpurella* (Stephens, 1835). Thus, the record of *E. chrysolepidella* from Karelia was also based on a misidentification.

The male specimen identified by A. A. Lastukhin as *I. koerneriella* clearly belongs to the genus *Incurvaria* Haworth, 1829. However, *I. koerneriella* has plain wings without a pattern, whereas the forewings of the specimen from the collection of A. A. Lastukhin have clearly visible light spots: one small spot at the costal margin, at about 0.8 of the wing length from its base, and two large triangular spots at the dorsal margin (Fig. 4). These spots are typical for *I. oehlmanniella* (Hübner, 1796), and the characters of the male genitalia support this identification. *I. oehlmanniella* was reported earlier from the mid-Volga region (Kozlov 2008b).

The situation with *L. aeneella* is more complicated, because, as noted by Huemer (2013, p. 205): "the species was described without further details from Austria, its taxonomic status is doubtful, and there exists no type material". Nevertheless, Heinemann (1870) described the forewing colour of *L. aeneella* as greenish and did not indicate the existence of any forewing pattern in this species. Intriguingly, Zaguljaev (1978b) published a drawing of the male genitalia of *L. aeneella*, but I strongly doubt that this drawing was made from the specimen of *L. aeneella sensu* Heinemann. Thus, reliable identification of *L. aeneella* is not possible at the moment.



Figures 1–4. The investigated specimens from the private collection of A. A. Lastukhin. **1.** *Lampronia* sp. (misidentified as *Eriocrania chrysolepidella*), the mode of preservation, scale: 10 mm; **2.** *Incurvaria oehlmanniella* (misidentified as *I. koerneriella*), the mode of preservation (the text in blue pen: "[Genitalia] preparations are macerated, they could be softened by boiling in water"), scale: 10 mm; **3.** *Lampronia* sp., wing venation and pattern, scale: 1 mm; **4.** *I. oehlmanniella*, wing venation and pattern, scalebars: 1 mm.

The pinned specimen from Chuvashia, which Lastukhin (2001, 2007) reported as *L. aeneella*, bears an identification label signed by A. A. Lastukhin. This label indicates that the specimen was identified by him as *L. rupella* (Denis & Schiffermüller, 1775), and I agree with this identification. The specimen has clearly patterned wings, so that it could not, in any way, belong to the unpatterned *L. aeneella*. I asked A. A. Lastukhin about the reasons behind the mismatch between the published data and the identification label, and he responded that he had first identified the moth as *L. aeneella*, but changed his opinion later on.

Discussion

The proportion of erroneous faunistic records of moths and butterflies, which are scattered across many data sources, may be much larger than is commonly thought. For example, 37 of 733 records of moths and butterflies from the Murmansk Oblast of Russia, which were reported by different authors in the first edition of the Catalogue, were identified as erroneous (Kozlov and Kullberg 2010). Similarly, 30 of 108 species were reported erroneously, or without a proper factual support, from the Nenets Autonomous Okrug and the Novaya Zemlya Region (Kozlov, Kullberg and Zverev, unpublished data).

The legacy effect of publications containing erroneous data is difficult to overcome. Entomologists are much more motivated to publish new records rather than revise old faunistic data. A search in the Web of Science (all databases) conducted on 16 March 2018 identified 864 publications whose titles mentioned new or first records of some Lepidoptera species or other taxa in some regions. By contrast, only three (!) publications had titles that mentioned corrections of errors in faunistic data published earlier. Nevertheless, some studies publishing new records also report previous misidentifications and correct other errors in the data (e.g. Kozlov and Jalava 1994; Kozlov and Kullberg 2010; Corley 2015).

Regrettably, the published corrections often fail to stop the spread of erroneous data. For example, we explicitly indicated long ago (Kozlov and Jalava 1994) that the records of *Nematopogon metaxella* (Hübner, 1813) (Adelidae), *Agonopterix arctica* (Strand, 1902) (Depressariidae) and *Elachista poae* Stainton, 1855 (Elachistidae) from the Pechenga area in the Murmansk Oblast of Russia (the Petsamo area of Finland at the time of moth collection) published by Valle (1933) are erroneous, or at least doubtful, as they are based on either misidentified or unknown specimens. Nevertheless, the publication by Valle (1933) was uncritically used for preparation of the first edition of the Catalogue, in which these species were reported as occurring in Murmansk Oblast of Russia, so that we were forced to comment on this situation once more (Kozlov and Kullberg 2010).

The long-term persistence of the problematic natural history data in entomological literature can be illustrated by the information on the presumed host plant of *Eriocrania argyrolepidella* Fuchs, 1904 (the junior subjective synonym of *E. cicatricella* (Zetterstedt, 1840)). Larvae of all Eriocraniidae species described by the end of the 19th century mined leaves of trees belonging to families Betulaceae and Fagaceae (Meyrick 1912). Nevertheless, the anecdotal observation that the type series of *E. argyrolepidella* was collected near *Populus tremula* trees (Fuchs 1904) resulted in an unjustified assumption that larvae of this species are presumably mining the leaves of trembling aspen. This assumption was included in a book by Spuler (1910) and subsequently repeated in many revisions and keys. The most recent studies known to me, which reported *E. argyrolepidella* as a distinct species presumably feeding on aspen, were published 40 years ago (Davis 1978; Zaguljaev 1978a). In my opinion, this erroneous information on the presumed host plant led to a delay in the clarification of the taxonomic status of *E. argyrolepidella*.

Clearly, large compiled works, such as checklists or identification keys, will never be completely error-free, so I mention some errors not to criticise the authors but to urge that lepidopterologists take the utmost care to ensure the high quality of the published faunistic and natural history information.

Conclusion

To date, I am not aware of any reliable records of *E. chrysolepidella*, *I. koerneriella* or *L. aeneella* from Russia, although the first two species occur in Scandinavia and/or in the Baltic countries (Aarvik et al. 2017) and therefore could potentially be found in Russia. The widespread occurrence of errors, even in the most authoritative works, calls for a critical approach to published faunistic and natural history data in order to stop spreading and citing false records across future publications.

Figures 5–6. Genitalia preparations, as preserved by A. A. Lastukhin. **5.** *Lampronia* sp. (misidentified as *Eriocrania chrysolepidella*), female, scale: 1 mm; **6.** *Incurvaria oehlmanniella* (misidentified as *I. koerneriella*), male, scale: 1 mm.

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